

Lab 20 - FAX over IP

CCNA Voice Lab 20

FAX over IP

Lab Objective:

The objective of this lab exercise is for you to learn and understand how to implement fax over IP services in VoIP networks using IP-to-IP gateways

Topic Description:

Fax relay and fax passthrough are used to allow faxes to be sent over IP networks

Lab Difficulty:

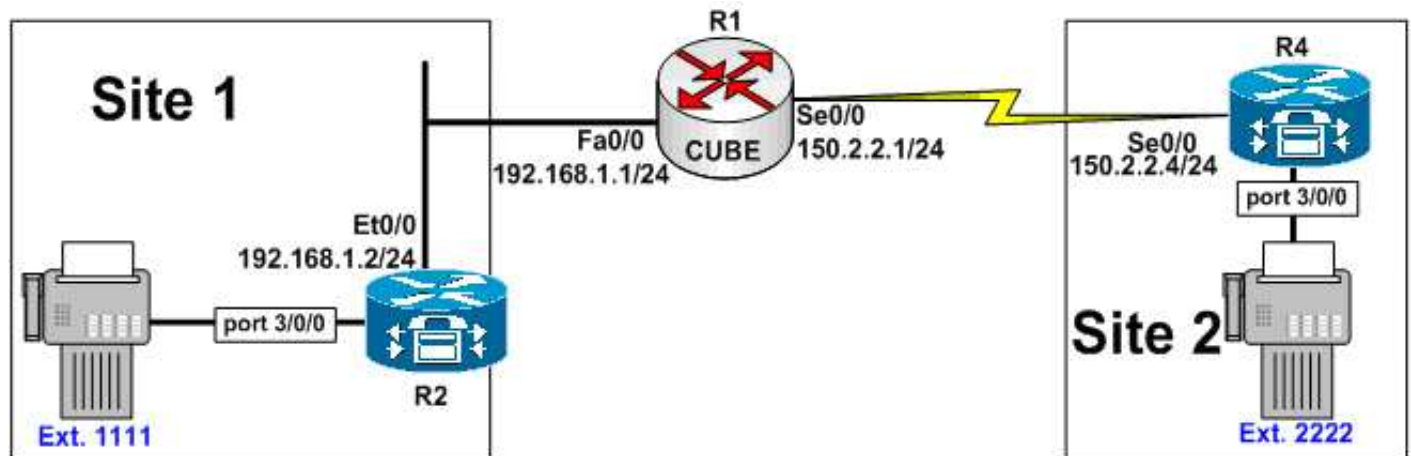
This lab has a difficulty rating of 6/10

Readiness Assessment:

When ready for your exam, you should be able to complete this lab in no more than 15 minutes

Lab Topology:

Please use the following topology to complete this lab exercise:



Lab 20 Configuration Tasks

Task 1:

Configure the hostnames and IP addresses on R1, R2 and R4 as illustrated in the diagram. Configure R4 to provide clocking to R2. Configure the clock rate on R4 as 800Kbps

Task 2:

Configure WAN connectivity between R1 and R4 using the IP addresses specified in the diagram. Configure R4 to provide a clock rate of 800Kbps to R1

Task 3:

Configure IP connectivity between R1 and R2 using the addresses illustrated in the diagram

Task 4:

Configure IP connectivity between R1, R2, and R4 using a routing protocol of your choice

Task 5:

Configure CUBE to allow H.323-to-H.323 calls between R2 and R4. Configure the appropriate dial peers based on the extensions illustrated in the diagram

Task 6:

Configure POTS and VoIP dial peers on R2 and R4 as illustrated in the diagram

Task 7:

Configure T.38 fax relay to allow for fax services between R2 and R4. You can perform the configuration globally or on a per-dial peer basis

Task 8:

Verify your configuration using the appropriate **show** and **debug** commands

Lab 20 Configuration and Verification

Task 1:

```
Router(config)#hostname R1
R1(config)#exit
```

```
Router(config)#hostname R2
R2(config)#interface Serial0/0
R2(config-if)#description .Connected To R4 Serial 0/1.
R2(config-if)#ip address 150.1.1.2 255.255.255.0
```

```
Router(config)#hostname R4
R4(config)#interface Serial0/1
R4(config-if)#description .Connected To R2 Serial 0/0
R4(config-if)#ip address 150.1.1.4 255.255.255.0
R4(config-if)#clock rate 800000
```

Verify connectivity by performing a simple ping between the two routers

```
R2#ping 150.1.1.4
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 150.1.1.4, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
```

```
R4#ping 150.1.1.2
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 150.1.1.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/8 ms
```

Task 2:

```
R1(config)#int s0/0
R1(config-if)#description .Connected To R4 Serial 0/0.
R1(config-if)#ip address 150.2.2.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
```

```
R4(config)#int s0/0
R4(config-if)#description .Connected To R1 Serial 0/0.
R4(config-if)#ip address 150.2.2.4 255.255.255.0
R4(config-if)#clock rate 800000
R4(config-if)#no shutdown
```

```
R4(config-if)#exit
```

Verify connectivity by performing a simple ping between the two routers

```
R1#ping 150.2.2.4
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 150.2.2.4, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms

```
R4#ping 150.2.2.1
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 150.2.2.1, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/8 ms

Task 3:

```
R2(config)#int e0/0
```

```
R2(config-if)#description .Connected To R1.
```

```
R2(config-if)#ip address 192.168.1.2 255.255.255.0
```

```
R2(config-if)#no shutdown
```

```
R1(config)#int f0/0
```

```
R1(config-if)#description .Connected To R2.
```

```
R1(config-if)#ip address 192.168.1.1 255.255.255.0
```

```
R1(config-if)#no shutdown
```

```
R1(config-if)#exit
```

NOTE: If you are using the Howtonetwork.net rack to complete this lab exercise, then you will also need to configure Sw1 as follows:

```
hostname Sw1
```

```
!
```

```
vlan 12
```

```
 name R1_R2_VLAN
```

```
!
```

```
interface FastEthernet0/2
```

```
 description 'Connected To R1 FastEthernet 0/0'
```

```
 switchport mode access
```

```
 switchport access vlan 12
```

```
 no shutdown
```

```
!
```

```
interface FastEthernet0/3
```

```
 description 'Connected To R2 FastEthernet 0/0'
```

```
 switchport mode access
```

```
 switchport access vlan 12
```

```
 no shutdown
```

Task 4:

```
R1(config)#router eigrp 100
```

```
R1(config-router)#no auto-summary
```

```
R1(config-router)#network 0.0.0.0
```

```
R1(config-router)#exit
```

```
R2(config)#router eigrp 100
```

```
R2(config-router)#network 0.0.0.0
```

```
R2(config-router)#no auto-summary
```

```
R2(config-router)#exit
```

```
R4(config)#router eigrp 100
```

```
R4(config-router)#network 0.0.0.0
```

```
R4(config-router)#no auto-summary
```

```
R4(config-router)#exit
```

Verifying connectivity:

Verify EIGRP adjacencies and IP connectivity between the three routers:

R1#**show ip eigrp neighbors**

IP-EIGRP neighbors for process 100

H	Address	Interface	Hold	Uptime	SRTT	RTO	Q	Seq
		(sec)	(ms)		Cnt	Num		
1	192.168.1.2	Fa0/0	14	11:56:39	796	4776	0	12
0	150.2.2.4	Se0/0	13	11:56:39	5	200	0	15

R1#

R1#**show ip route eigrp**

150.1.0.0/24 is subnetted, 1 subnets

D 150.1.1.0 [90/2195456] via 192.168.1.2, 11:56:40, FastEthernet0/0

R2#**show ip eigrp neighbors**

IP-EIGRP neighbors for process 100

H	Address	Interface	Hold	Uptime	SRTT	RTO	Q	Seq
		(sec)	(ms)		Cnt	Num		
1	192.168.1.1	Et0/0	10	10:54:52	5	200	0	11
0	150.1.1.4	Se0/0	13	10:56:01	6	200	0	14

R2#

R2#**show ip route eigrp**

D 192.168.2.0/24 [90/2195456] via 150.1.1.4, 10:54:53, Serial0/0

150.2.0.0/24 is subnetted, 1 subnets

D 150.2.2.0 [90/2195456] via 192.168.1.1, 10:54:53, Ethernet0/0

R4#**show ip eigrp neighbors**

IP-EIGRP neighbors for process 100

H	Address	Interface	Hold	Uptime	SRTT	RTO	Q	Seq
		(sec)	(ms)		Cnt	Num		
2	150.2.2.1	Se0/0	12	10:51:01	23	200	0	10
0	150.1.1.2	Se0/1	14	10:52:10	19	200	0	11

R4#

R4#**show ip route eigrp**

D 192.168.1.0/24 [90/2195456] via 150.2.2.1, 10:51:36, Serial0/0
[90/2195456] via 150.1.1.2, 10:51:36, Serial0/1

Task 5:

R1(config)#**voice service voip**

R1(conf-voi-serv)#**allow-connections h323 to h323**

R1(conf-voi-serv)#**exit**

R1(config)#**dial-peer voice 1 voip**

R1(config-dial-peer)#**destination-pattern 1111**

R1(config-dial-peer)#**session target ipv4:192.168.1.2**

R1(config-dial-peer)#**exit**

R1(config)#**dial-peer voice 2 voip**

R1(config-dial-peer)#**destination-pattern 2222**

R1(config-dial-peer)#**session target ipv4:150.2.2.4**

R1(config-dial-peer)#**exit**

Task 6:

R2(config)#**dial-peer voice 1 pots**

R2(config-dial-peer)#**destination-pattern 1111**

R2(config-dial-peer)#**port 3/0/0**

R2(config-dial-peer)#**exit**

R2(config)#**dial-peer voice 2 voip**

R2(config-dial-peer)#**destination-pattern 2222**

R2(config-dial-peer)#**session target ipv4:192.168.1.1**

R2(config-dial-peer)#**exit**

R4(config)#**dial-peer voice 1 pots**

R4(config-dial-peer)#**destination-pattern 2222**

R4(config-dial-peer)#**port 3/0/0**

R4(config-dial-peer)#**exit**

R4(config)#**dial-peer voice 2 voip**

```
R4(config-dial-peer)#destination-pattern 1111
R4(config-dial-peer)#session target ipv4:150.2.2.1
R4(config-dial-peer)#exit
```

Task 7:

```
R1(config)#dial-peer voice 1
R1(config-dial-peer)#fax protocol t38
R1(config-dial-peer)#exit
R1(config)#dial-peer voice 2
R1(config-dial-peer)#fax protocol t38
R1(config-dial-peer)#exit
```

```
R2(config)#voice service voip
R2(conf-voi-serv)#fax protocol t38
```

```
R4(config)#dial-peer voice 2
R4(config-dial-peer)#fax protocol t38
R4(config-dial-peer)#exit
```

Task 8:

R1#**show call active voice compact**

```
<callID> A/O FAX T<sec> Codec      type Peer Address      IP R<ip>:<udp>
Total call-legs: 2
    11 ANS   T0    g729r8   VOIP P1111   192.168.1.2:18662
    12 ORG   T0    g729r8   VOIP P2222   150.2.2.4:18292
```

R2#**show voice call summary**

```
PORT      CODEC   VAD VTSP STATE      VPM STATE
=====
3/0/0      t38      n S_FAX      FXSLS_CONNECT
3/0/1      -      - -          FXSLS_ONHOOK
3/1/0      -      - -          FXOLS_ONHOOK
3/1/1      -      - -          FXOLS_ONHOOK
```

R2#

R2#**show call active fax compact**

```
<callID> A/O FAX T<sec> Codec      type Peer Address      IP R<ip>:<udp>
Total call-legs: 1
    29 ANS FAX T23   7200      TELE P1111
```

R2#

R2#**show voip rtp connections**

VoIP RTP active connections :

```
No. CallId  dstCallId LocalRTP RmtRTP LocalIP      RemoteIP
1  30      29      18314 17508 192.168.1.2  192.168.1.1
```

Found 1 active RTP connections

R4#**show voice call summary**

```
PORT      CODEC   VAD VTSP STATE      VPM STATE
=====
3/0/0      g729r8   y S_CONNECT  FXSLS_CONNECT
3/0/1      -      - -          FXSLS_ONHOOK
3/1/0      -      - -          EM_ONHOOK
3/1/1      -      - -          EM_ONHOOK
```

R4#

R4#**show call active fax compact**

```
<callID> A/O FAX T<sec> Codec      type Peer Address      IP R<ip>:<udp>
Total call-legs: 1
    26 ORG FAX T15   7200      TELE P2222
```

R4#

R4#**show voip rtp connections**

VoIP RTP active connections :

```
No. CallId  dstCallId LocalRTP RmtRTP LocalIP      RemoteIP
1  25      26      19572 16706 150.2.2.4    150.2.2.1
```

Found 1 active RTP connections

Final Relevant Configuration R1:

R1#**show running-config**

Building configuration...

Current configuration : 1876 bytes

```
!  
version 12.4  
service timestamps debug datetime msec  
service timestamps log datetime msec  
no service password-encryption  
!  
hostname R1  
!  
!  
!  
!  
voice service voip  
  allow-connections h323 to h323  
!  
!  
!  
interface FastEthernet0/0  
  description .Connected To Switch 1 FastEthernet 0/2.  
  ip address 192.168.1.1 255.255.255.0  
!  
interface Serial0/0  
  description .Connected To R4 Serial 0/0.  
  ip address 150.2.2.1 255.255.255.0  
!  
router eigrp 100  
  network 0.0.0.0  
  no auto-summary  
!  
!  
!  
!  
dial-peer voice 1 voip  
  destination-pattern 1111  
  session target ipv4:192.168.1.2  
  fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback cisco  
!  
dial-peer voice 2 voip  
  destination-pattern 2222  
  session target ipv4:150.2.2.4  
  fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback cisco
```

Final Relevant Configuration R2:

R2#**show running-config**

Building configuration...

Current configuration : 1586 bytes

```
!  
version 12.4  
service timestamps debug datetime msec  
service timestamps log datetime msec  
no service password-encryption  
!  
hostname R2  
!  
!  
!
```

```

interface Ethernet0/0
description .Connected To Switch 1 FastEthernet 0/3.
ip address 192.168.1.2 255.255.255.0
!
interface Serial0/0
description .Connected To R4 Serial 0/1.
ip address 150.1.1.2 255.255.255.0
no fair-queue
!
!
router eigrp 100
network 0.0.0.0
no auto-summary
!
!
!
!
voice-port 3/0/0
!
voice-port 3/0/1
!
voice-port 3/1/0
!
voice-port 3/1/1
!
!
!
!
dial-peer voice 1 pots
destination-pattern 1111
port 3/0/0
!
dial-peer voice 2 voip
destination-pattern 2222
session target ipv4:192.168.1.1
fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback cisco

```

Final Relevant Configuration R4:

R4#**show running-config**

Building configuration...

Current configuration : 1514 bytes

```

!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R4
!
!
!
interface Serial0/0
description .Connected To R1 Serial 0/0.
ip address 150.2.2.4 255.255.255.0
clock rate 800000
!
interface Serial0/1
description .Connected To R2 Serial 0/0
ip address 150.1.1.4 255.255.255.0
clock rate 800000
!
router eigrp 100
network 0.0.0.0
no auto-summary

```

```
no auto-summary
!  
!  
!  
voice-port 3/0/0  
!  
voice-port 3/0/1  
!  
voice-port 3/1/0  
!  
voice-port 3/1/1  
!  
!  
!  
dial-peer voice 1 pots  
destination-pattern 2222  
port 3/0/0  
!  
dial-peer voice 2 voip  
destination-pattern 1111  
session target ipv4:150.2.2.1  
fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback cisco
```



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